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UNITED STATES DEPARTMENT OF AGRICULTURE
OFFICE OF PUBLIC ROADS AND RURAL ENGINEERING
WASHINGTON, D. C.

FIELD LETTER FOR DECEMBER

January 1, 1916.

No. 11.

DIVISION OF CONSTRUCTION
Vernon M. Peirce, Chief

Projects:

General

Vernon M. Peirce, Chief, left Washington December 14 to inspect the work on the post road in Aiken County, South Carolina, and to confer with Dr. S. W. McCallie, State Geologist, and with B. F. Heidel, S.H.E., at Atlanta, in regard to further cooperative work between the State Geologist and the Office of Public Roads and Rural Engineering. He returned to the Office December 20.

Post Roads

The final report of the Maine Post Road was received at the Office from E. O. Hathaway, S.H.E., December 28.

The concrete surfacing of the Ohio Post Road has been completed but considerable work remains to be done next year in the construction of shoulders and side ditches. C. H. Moorefield, S.H.E., and J. T. Pauls, J.H.E., reported to the Office December 14, and are assembling the data for the final report.

Work on the Mississippi Post Road has been postponed by the contractor until January 3.

Advice and Inspection

J. T. Voshell, S.H.E., consulted with the Commissioners of Monroe County, Indiana, regarding the improvement of the Dixie Highway, for which \$18,000 is available; and with the officials of Grant County, Indiana, concerning the construction and repair of the highways of that county.

B. H. Burrell, S.H.E., was assigned December 16 to confer with the officials of Lee County, at Opelika, Alabama, regarding the improvement of their roads.

L. I. Hewes, S.H.E., gave two lectures at a meeting at State College, Pa., December 30.

The assignment at Columbiana, Alabama, to confer with the officials of Shelby County regarding an investigation of some road work done there has been temporarily discontinued. W. H. Lynch, S.H.E., who was in charge of this assignment, will resume it January 3.

J. H. Dodge, S.R.C., inspected the experimental sections of roads constructed by the Office at Garden City, Dodge City, and Ford, Kansas. The work on the object-lesson road at Pawnee, Oklahoma, upon which he had been engaged, was completed December 17. He also addressed a convention of the State Good Roads Federation at Tulsa, Oklahoma, December 10 and 11. He is now on furlough at his home, Mantua, Ohio.

J. C. Wonders, S.H.E., finished the assignment at Hanover, Kansas, December 8 and addressed a meeting at Sedalia, Missouri, December 11.

J. A. Whittaker, S.H.E., made an inspection of the experimental rock asphalt road at Bowling Green, Kentucky, December 13.

E. S. Alderman, J.H.E., made an inspection trip in Florida of the experimental work at Miami, Buena Vista, Lemon City, Jupiter, and Ocala. He also assisted in the exhibit of the Board of Trade at Gainesville and discussed details of construction of the campus road on the University of Florida Grounds at the Central Florida Highway Association meeting held December 9.

C. H. Moorefield, S.H.E., inspected the slag experimental roads at Youngstown, Ohio, December 2 and 3, and some concrete roads in Detroit, Michigan, December 9 and 10.

C. H. Sweetser, S.H.E., addressed a meeting of the Rural Life Conference at Kirksville, Missouri, December 3, read a paper at a farmers' meeting at Valley City, N. D., December 10, and collected road statistics in Mercer, Bowman and Walsh Counties, North Dakota. He also read a paper and gave a short talk on "Dirt Roads" at a meeting at Mandan, North Dakota, December 17. Mr. Sweetser reported at the Office on December 20.

Field Experiments

The final report of the Mt. Vernon Avenue Experimental Road is being prepared and will be completed within a short time.

The work of clearing and grubbing on the experimental gravel road from near Gum Spring to Mt. Vernon, Virginia, is almost completed and the surfacing will be pushed as fast as the weather permits. J. H. Eldridge, S.R.C., is in charge, assisted by A. S. Hathaway, J.H.E.

The two sections of experimental road on the grounds of the Agricultural Department at Washington were completed December 7.

DIVISION OF MAINTENANCE
E. W. James, Chief.

Projects:

Miscellaneous

D. G. Haire, S.R.C., completed his work on section 1 of the Rockville Pike about December 15.

E. H. Young was appointed patrolman December 3 and will have charge of Bradley Lane, Kensington Road, and of the first three sections of the Rockville Pike, Montgomery County, Maryland.

Advice, Inspection and Lectures

E. W. James, Chief, left Washington December 6 for a general inspection of the Washington-Atlanta Highway and accompanied Mr. Winslow over the northern section from Blackstone, Virginia, to Fayetteville, North Carolina, from the 6th to the 8th; inspected Mr. Spoon's section from Columbia, S. C., to Augusta, Georgia, on the 9th and 10th, and Mr. Scales' section from Augusta to Atlanta and return, over both routes, from the 11th to 14th inclusive. It is intended to have the inspection completed between Fayetteville, N. C., and Columbia, S. C., at an early date in January.

On December 15, 16, and 17, Mr. James attended the Southern Commercial Congress at Charleston, S. C., and on the 17th delivered an address at the morning session - subject "Road Maintenance and Its Significance."

Mr. Scales attended the County meeting of the Central Florida Association at Gainesville, Florida, on December 7, and the Central Florida Highway Association Convention at the same place on December 9, and delivered addresses before both sessions.

State and County Studies

An extensive report has been written as the result of a systematic inspection in Baltimore County, Maryland, by E. W. James and A. S. Brainard, S.H.E., and E. L. Vipond, of the Division of Economics. It is expected that this report will be issued about January 3.

S. L. Taylor left Washington December 25, to begin a series of county studies in Spartanburg County, S. C.; Mecklenburg County, N. C.; Charleston County, S. C.; Chatham County, Georgia; and other counties in the southeast. These studies will be confined strictly to the practical details of road maintenance operations and Mr. Taylor will spend his time with the maintenance gangs in these counties.

Washington-Atlanta Highway

A full report of the inspection made by Mr. James in company with the engineers in charge of the several sections is now in course of preparation. The general condition of the road was much more satisfactory than at the time of the corresponding inspection last fall,

and up to December 27, when the northern section was traveled by Mr. Towles, the entire road was in good condition. This is four days later than the first interruption occurred last year in the serviceable condition of the road, and the general impression is that, unless unusually severe weather conditions prevail, the road will probably be open from two to three weeks longer than last year.

Field Experiments

Rockville Pike:

Mr. Haire was in charge of a gang of from four to seven men and one team dressing shoulders and cleaning ditches on Section 1. This work ends the heavy maintenance this season.

Mount Vernon Avenue:

The experimental road constructed under the supervision of L. I. Hewes, S.H.E., during the past two seasons has been completed and is to be turned over to this Division at once for maintenance. Arrangements have been approved for the assignment to this Division of J. H. Eldridge, S.R.C., who will be placed in immediate supervision of all maintenance work on the experimental roads in the vicinity of Washington. At the close of the next construction season, there will be about forty miles of such road. J. M. Whitehead will be patrolman on the Mount Vernon Avenue section, which is 4.5 miles long.

Calcasieu Parish:

Fred Shutts, Collaborator, Lake Charles, La., is furnishing data on the maintenance costs on approximately 60 miles of road. These figures will be used to check those secured on the experimental roads and to furnish further reliable information regarding maintenance costs.

New Projects

Mr. James had a conference with Mr. Hickerson of the North Carolina State Highway Commission on returning from Charleston, and made arrangements to cooperate more intimately with the State Commission in arranging for supervision of maintenance on the Central Highway in North Carolina.

DIVISION OF NATIONAL PARK AND FOREST ROADS
T. Warren Allen, Chief.

Projects:

NATIONAL FOREST ROADS

District 2 - A. E. Palen, H.E., in charge.

Field Work

Construction and maintenance of the Rabbit Ear Road closed down November 20. Resident Engineer in charge working on quantities and reports. Superintendent of Construction on furlough for winter.

Construction of Sedalia-Decker Springs (known formerly as Sedalia-Nighthawk) road closed down November 10, crew and supervision moved to the construction of the Monument-Nursery Road which closed December 17 on account of frost and snow. Superintendent in office on reports, and resident engineer on furlough for winter. The force of rangers will be working on the bridges and right-of-way fences of this project till January 1 when they will be moved to the Sedalia-Decker Springs Road for winter work on rock with the drilling machine.

Maintenance of Sedalia-Decker Springs Road was established November 10 and that of Cochetopa Pass was under way until about December 15; both are now frozen up.

Survey completed on Idaho Springs-Central City Road December 12, engineer on leave till January 1, and assistant in office.

Survey of the Nederland-Ward-Allenspark Road in charge of assistant engineer who is now in the office was temporarily closed December 17 on account of snow.

Construction of Buffalo-Hazeltown Road closed November 10 for the season. Superintendent transferred to assist on the Monument-Nursery Road and is now on leave till January 1.

Green River bridge finished this winter. Construction began on Deadwood-Hot Springs Road October 10 and still under way. Rock drilling machine on this project and is showing fine results. Holes drilled for 12 cents per foot. A superintendent of construction and engineer as resident are assigned on this project.

Two miles of sand-lime road construction under way on Kanab National Forest.

Office

Office work for this winter will be carried on with the assistance of one engineer, three assistant engineers and one superintendent of construction. One engineer and one assistant engineer and two superintendents of construction will be on two construction projects for most of the winter. One assistant engineer and one superintendent of construction on furlough for winter. Office work under way besides the reports (two men on these at present) are the plans for the

Sedalia-Decker Springs Road 13 miles, Nederland-Ward-Allenspark Road 16 miles, Idaho Springs-Central City Road 8 miles, and the Cass Lake and Mississippi River bridge location surveys. A reconnaissance report and plans for 65 miles of auto' roads in the Mt. Evans district were finished.

District 3 - O. N. Powell, H.E., in charge.

The survey of the Alpine-Reserve Road was completed December 1. This road is part of the East and West system and will connect the Forest system of Arizona with the New Mexico system.

The survey party in charge of Mr. Stephenson completed the survey of the Carlsbad-Queen Road December 15. This road was through fairly easy country and very rapid progress was made - an average of about one and a half miles for each working day. This road is part of the through road from Carlsbad to El Paso.

On December 5 the party under Mr. MacBeath left for Tucson to begin the survey of the Tucson-Mt. Lemmon Road. This is a project in which the people of Tucson are greatly interested as it will give them an access to the high pine lands of the Catalina Mountains and afford an excellent summer resort. The county voted a bond issue of \$100,000 to build this road and the Forest Service agreed to cooperate to the extent of making the survey. This is an extremely difficult piece of work as it is necessary to make an elevation of 5,000 feet within a distance of about 20 miles. The country is very rough and there will be a great amount of heavy rock work which also makes the survey difficult as in many places there are high rock cliffs on which it will be necessary to use ropes for the men to take cross-sections. The beginning of this work was considerably delayed on account of the snow storm which rendered survey work impossible.

District 4 - C. H. Kendall, S.H.E., in charge.

In Idaho, upon the South Fork Payette River Road, the work during the month has been largely confined to the unloading and transportation of the 65-foot steel bridge about 40 miles to the Deadwood bridge site. Snowbound roads and storms have delayed this work. Some rock excavation and grading has been done east of the Oxbow upon the short uncompleted section of the road.

In Nevada, upon the Secret Pass Road, Ruby National Forest, a small crew of men are working with the compressor outfit upon the last 1400-foot section of the road which is heavy rock work.

In Utah, work upon the Winder-Escalante Road, Powell National Forest, has been completed for the season and a 10-mile section of new location east of the summit has been joined up and opened to travel.

In Arizona, some rangers are improving and repairing the "Jump Up" Road and Ryan-Big Spring Road in the Kaibab National Forest. Severe storms have damaged these roads badly and an allotment from maintenance

funds has been made in cooperation with an equivalent amount of work by interested stockmen and settlers.

Office work has been devoted largely to assembling the project reports and preparing data for the annual calendar-year report.

District 5 - C. C. Morris, H.E., in charge.

In the field the work of clearing right-of-way, begun on November 15, using day labor, was continued. The work is in charge of a foreman and an average of ten men are employed. These are subsisted at a government camp. A small portion of the time of this gang was required to clean slides off the four miles of the road constructed in 1913. The rainfall is very heavy on the Lower Trinity, but very little time was lost on account of bad weather.

In the office, work proceeded on the plans covering those portions of the line over which changes were surveyed in the field during the months of September and October. These changes cover about 50 per cent of the total line and have in view improvements in both line and grade. Over the new survey the total length of road will be about 1500 feet less than over the previous one. Work was begun on the redesign over those portions of the line not changed, this new design having for its object the elimination of much of the dry wall previously used. The bill against Swanson Brothers for right-of-way condemnation was prepared by the U. S. District Attorney and forwarded to the Attorney General for approval about the 10th instant. It is not the intention to do any grading until the conclusion of this suit.

In addition to the above a reconnaissance was made of two small projects in the Sierra National Forest.

District 6 - B. J. Finch, S.H.E., in charge.

During the month of December construction work has been in progress in but one project in District 6. This project, the Elk Creek Road in the Umpqua National Forest, was started November 14, and work is continuing with a force of about 25 men. Owing to a lack of tools and powder the work was slow in getting started, but with these now at hand the work is going on satisfactorily.

In the office work is progressing on plans for the Mount Hood Road in the Oregon National Forest, the McKenzie River Road in the Cascade National Forest, and the Blewett Pass Road in the Wenatchee National Forest. It is expected to finish the plans on the latter two roads about January 1, 1916. Work on the plans for the Mount Hood Road, 25 miles in length, will probably not be finished until January 15, 1916.

Reports are being made up in the office on a list of projects for the States of Oregon and Washington, also individual reports on each one of these projects.

NATIONAL PARK ROADS

In charge of T. C. Peterson, J.H.E.

Work during the month was confined to a continuation of work upon plans for the Lake McDonald East Shore Road in Glacier National Park and a small amount of work on completion of plans for the easterly three-mile section of the El Portal-Pohono Bridge Road in the Yosemite National Park.

Skamania County, Washington.

In charge of J. W. Ball, J.H.E.

In Skamania County during the month of December good progress was made, although there were only eight days during which it did not rain. In spite of the wet weather, however, the contractor had kept work going on his Stevenson-Collins Road contract. He is doing his work by station crews and has at present seven such crews of from eight to fifteen men each working at different points along the line. The material is handled by dump cars and tracks. The clearing is completed on this contract from station 68 - 280 and from station 360 - 540. From 410 - 500 the line was located finally so as to go around Wind Mountain on a bench about a hundred feet lower in elevation than shown on the plans. This location gives only about eight hundred feet of construction through a talus slide. The construction through the slide is practically complete and has given no trouble.

The work on the plans for the "Mill A - Underwood Section" (this is the division in the east end of the county) is practically complete. There are 687 stations in this division.

The county has quite a lot of right-of-way to secure before we can let this contract. Due to the fact that we have worked up right-of-way plats and waivers for each piece of property to be crossed it has taken a lot of time to complete this set of plans.

On the Clarke County Line - Cascade Division (this is the section in the west end of the county) the preliminary survey was completed December 10, 1915. There are 1103 stations in this section. This is mostly earth work but the country is rough, making large yardage. The base line for this section is all platted. The profile is plotted to station 500 and the cross-sections to station 600; the center line is projected to station 400.

Surveys were completed December 1 for 42 miles of road, the cost of field work on such surveys being \$75.80 a mile.

It will be necessary to send a party into the field and make some more right-of-way surveys and prepare right-of-way plots and releases for this section of work as we did for the Mill A - Underwood Road. It will probably take six weeks to complete the plans before this section can be advertised for bids.

U. S. Highway Engineer's Manual

This work is being taken up in the belief that a Manual for Highway Engineers will be of great value to highway engineers throughout the United States, and especially in the western states, if so written as to be a guide from the initiation of the reconnaissance to the time when the road has been constructed and is under maintenance. The organization believed necessary will be given in detail for each class of work, with lists of the implements and supplies required, and in each case there will be a description of the methods for conducting the work. The arrangement of the subject matter will follow the order in which the work is taken up in practice.

DIVISION OF ROAD MATERIAL TESTS AND RESEARCH Prevost Hubbard, Chief.

Projects:

Administration

It is to be noted that there has been a general decrease in the activities of the Division during the past month, owing to the fact that practically every member of the force has been taking more or less extended leave at the end of the year and particularly through the holiday season. Mr. Hubbard is delivering his regular course of lectures in the Highway Engineering Course at Columbia University, New York, and will return to the Office about January 7.

Routine Tests and Analyses

During December 49 samples of bituminous material and 84 samples of rock, sand, gravel, etc., were examined. 53 samples were classified in the Microscopic Laboratory.

Research upon the Properties of Dust Preventives and Road Binders

The status of work along this line is about the same as reported in the last field letter. Conditions are now favorable for more active prosecution of the items under this project with the return of the laboratory force to duty on January 3.

Experimental Bituminous Road Construction and Maintenance

Mr. Reeve met Mr. Moorefield, H.E., in Youngstown, Ohio, early in the month and inspected the slag experiments there in company with a representative of the Carnegie Steel Company. The report of this inspection will appear in the Progress Report now being prepared.

Mr. Anderton conducted the inspection of materials at the paving plant which were used in constructing the experimental road on the Agricultural Department Grounds.

Non-Bituminous Road Material Investigations

The activities mentioned in previous field letters are being continued and in addition to these the force of the Physical Testing Laboratory has been engaged in the preparation of data to be included in a bulletin to be published in the near future. This publication will include the results of all physical tests of rock made by the laboratory up to January 1, 1916, together with an interpretation of the results obtained. The discussion will be illustrated in a unique way by curves showing the variations in physical properties of all the more important road building rocks.

The relations between some of the more important physical tests to date are discussed in a paper by Prevost Hubbard and F. H. Jackson, entitled: "The Relation between the Properties of Hardness and Toughness of Road Building Rocks," which will appear in an early number of the Journal of Agricultural Research.

Standardization of Methods of Testing

The paper by Messrs. Hubbard and Pritchard on "The Effect of Controllable Variables on the Penetration Test" will appear in an early number of the Journal of Agricultural Research.

Messrs. Reeve and Pritchard have in preparation a paper reviewing their work in the development of the new penetration needle now used by the Office, and this will be published in the near future.

Concrete Investigations

During the past month the reinforced concrete slab of 16-foot span, 32-foot width, and 6 inches effective depth, has been tested under four-point loading, and will be tested to destruction in the course of a few days.

Material for the construction of an apparatus for testing the distribution of pressure through soils is beginning to arrive at Arlington and it is expected that actual work of construction will begin very shortly.

Plans are now under way for a series of load tests on concrete bases of pavements made to determine their economical thickness.

The instrument for the determination of the wear of pavements of different types is now completed and has been found to work very satisfactorily.

DIVISION OF ROAD ECONOMICS
J. E. Pennybacker, Chief.

Projects:

Statistical Investigations.

The Postmaster General has authorized this Office to take up the matter of obtaining statistics on road mileage, revenues, and expenditures with the postmasters at county seats in the several counties which have not been heard from. On account of the holidays not many letters have been sent out, but after the first of the year this matter will be actively taken up. In all about 2300 counties have been heard from and information is practically complete for 21 states. It is hoped that this information will be very nearly complete by the first of February.

Experimental Convict Camp.

The portable buildings designed for the use of the experimental convict camp in Fulton County, Georgia, have been erected on the site selected for their first location, and all necessary preliminary arrangements have been made. It is expected that road work will be begun on January 3, with a force of 40 selected convicts employed under the honor system.

R. F. Eastham, H.E., has been assigned to take charge of the road work, and he will be assisted by Mack Galbreath, J.H.E. By means of a specially designed system of reports, accurate records will be kept of the various costs of maintenance and construction, and it is hoped that the observations made upon the work of this camp may point the way to a number of improvements which may be made in the present methods of employing convicts on road work.

Road Management Studies

J. J. Tobin, A.R.E., made road management studies in the towns of Saugus and Balmer, Massachusetts, during the month of December.

Road Material Freight Rates

Letters have been written to 78 railroads, requesting a statement from each showing freight rates on crushed stone and gravel on their lines, similar to a statement furnished by Southern Railway.

Lectures and Road Models

A. S. Brainard, S.H.E., was assigned to exhibit road models at the Second Annual Land Products and Live Stock Exposition at Toledo, Ohio, December 1 to 12. J. J. Tobin, A.R.E., exhibited road models at Worcester, Massachusetts, December 14 to 17, at the International Road Congress. Mr. Tobin also delivered an address before the Hampton County Improvement League at Tolland, Massachusetts, on December 20. L. E. Boykin, A.R.E., delivered a lecture before a meeting of the

State Grange, Keene, New Hampshire, on December 21. M. O. Eldridge, A.R.E., addressed the Engineers' Club at Dayton, Ohio, on December 21.

Owing to a ruling of the Attorney General of Tennessee, the State Highway Department is precluded from participating in the operation of the good roads train which it was proposed to operate over the railroads of the State of Tennessee. Consequently, plans for the running of this train have been abandoned.

J. E. Pennybacker, Chief, delivered an address on December 28 before the Second Pan American Scientific Congress, which is in session in Washington from December 27 to January 8.

The Panama-Pacific Exposition closed on December 4. The total estimated attendance at the Office exhibit from February 20 to December 4 was 456,150. The total attendance at the lectures, one of which was given each day except on Sunday, was 16,151. From August 23 to the close of the exposition 1,265 applications were made for government publications on road building. A part of this exhibit has been sent to the Republic of Panama, where a mid-winter exposition is to be held from January 21 to some time in May, and the balance of the exhibit is being returned to Washington.

County Economic Studies

M. O. Eldridge visited Spotsylvania and Dinwiddie Counties, Va., during the month of December for the purpose of obtaining additional information in regard to the economic studies of those two counties. Mr. Eldridge is now in the Office checking up the reports of these and the several other counties selected for economic studies.

State Highway Department Studies

J. D. Fauntleroy, S.H.E., was in Richmond, Virginia, in connection with the state highway department studies on which he is engaged. He is now in the Office checking up studies that have already been made.

Economic Studies of Post Roads

W. E. Rosengarten, H.E., has completed economic studies of post roads in the states of North and South Carolina, and is now in the Office writing up reports for all of the roads that have been studied.

DIVISION OF RURAL ENGINEERING
E. B. McCormick, Chief.

Projects:

Domestic Water Supply and Sewage Disposal

The 900-foot sewer at the Animal Husbandry Farm, Beltsville, Md., is completed.

Concrete is being laid in the septic tank of the model sewage disposal plant at Bethesda, Maryland.

G. M. Warren, D.E., is making a tour of western points to lecture on water supply and sewage disposal. He will attend a number of "short courses" for this purpose.

Farm Structures

Work has been started on a model of a farmstead to be used in connection with a bulletin on the subject which is in course of preparation. It is expected that the model will be exhibited at county fairs and agricultural educational conventions.

Working drawings are nearing completion for a five-room southern farmhouse which contains several unusual features.

An experimental pen constructed for the Bureau of Animal Industry in connection with an experiment in individual feeding of hogs has been tried out and found to work satisfactorily. The drawings for a series of such pens are almost completed. It is hoped that the pens will be completed by February 1.

Wallace Ashby is now visiting reclamation projects in the West in order to study the conditions under which hog raising is conducted. Upon his return, drawings will be made for buildings and equipment suitable to the varying conditions.

Correspondence on subjects relating to farm structures continues to be heavy. A great many blueprints have been issued. The demand for prints of the corn crib recently published in the Weekly News Letter continues.

Field Experiments

Elmer Johnson, A.M.E., is on leave.

The final report on the Iowa Post Road at Ames, Iowa, is complete, and work is progressing on the Alexandria, Virginia, report.

A portable recording dynamometer manufactured by the Hyatt Roller Bearing Company for measuring the tractive ability of tractors was tested with the dynamometer wagon at the Arlington Farm.

G. H. Hicks has been engaged as Student Assistant to assist in the planimeter work.

DIVISION OF ADMINISTRATION
Accounts - W. C. Wyatt, in charge.

The Auditor for the State and Other Departments has disallowed charges for revenue stamp tax on telegram, express, and telephone when used for official business. In the future you should not pay this tax as it will be necessary to disallow the amount from your account.

Annual Leave

During the year just passed there has been some misunderstanding with respect to annual leave for field men. The Department regulations provide that employees outside of the city of Washington may be granted leave of absence not to exceed fifteen days in any one calendar year. The regulations also provide that field employees who are transferred to the service in Washington may be granted leave at the rate of one and one-fourth days per month until the date of transfer, and two and one-half days per month in Washington.

Field employees serving temporarily in Washington will not be granted leave in excess of fifteen days annual and fifteen days sick leave in any one year. A field employee, therefore, who is not in the apportioned or Washington service, can not be granted leave in excess of fifteen days, even though serving in Washington, unless his appointment has been changed so as to bring him within the apportioned service.

DIVISION OF DRAINAGE INVESTIGATIONS
S. H. McCrory, Chief.

Projects:

Administration

On December 4, S. H. McCrory left for Bartlesville, Oklahoma, where he conferred on the 7th with interested land owners in Washington County. On his return trip, he visited O. G. Baxter, Little Rock, Arkansas, spent one day at Memphis, Tennessee, conferring with engineers and contractors; and then proceeded to Winfield, Alabama, where he conferred with L. A. Jones relative to the survey of the Luxappalila River Drainage District.

Farm Drainage

During the month, Fred F. Shafer, D.E., made surveys for a number of tile projects in Virginia and West Virginia.

On December 23, O. G. Baxter, D.E., arrived at Bay City, Texas, where he is engaged on a number of tile projects in that vicinity in cooperation with the Texas Agricultural Experiment Station.

During the month, J. R. Haswell, D.E., has been superintending the construction of a system of tile drains on the farm of Dr. Griffin Holland, Eastville, Virginia.

H. M. Lynde, S.D.E., made surveys and staked out tile drains on several farms in North Carolina.

Reports Transmitted:

D-26B Frank Holman Farm, Sumter County, Ala., by Lewis A. Jones.
D-8X McLendon Farm, Anson County, N. C., by H. M. Lynde.

Reports Received:

D-7 Polk Farm, W. Va., by F. F. Shafer.
D-7 Hissam Farm, Tyler Co., W. Va., by F. F. Shafer.
D-7 Everett Farm, Ona, W. Va., by F. F. Shafer.
D-7 Ensign Farm, Huntingdon, W. Va., by F. F. Shafer.
D-7 Clay Farm, Marshes, W. Va., by F. F. Shafer.
D-8 Ingram Farm, Anson Co., N. C., by F. R. Baker*
*Assistant Drainage Engineer furnished by North Carolina
Department of Agriculture.

Overflowed Lands

A preliminary examination of the Meadow River Drainage District, Greenbrier Co., W. Va., was made December 10-13 by Fred F. Shafer, D.E.

On December 8, D. L. Yarnell, D.E., made an examination of the Bush River, near Farmville, Virginia. During the remainder of the month he was in the Office engaged on the maps and report of the Monona-Harrison Drainage District, Onawa, Iowa.

O. G. Baxter, D.E., completed for the present the work of installing experimental drains on the Scarborough Farm near Hull, Illinois, and left on December 4 for Little Rock, Arkansas.

On December 22-23, J. V. Phillips, D.E., made a survey of the New Market Drainage District near Newport News, Va., which contemplates the drainage of about 7000 acres of land by a cut-off from a creek to the James River.

A movement is on foot to construct the improvements along the Deep Fork of the Canadian River in Lincoln and Okmulgee Counties, Okla., of which the Office made surveys in 1909.

The lands along the Marais des Cygnes River, Kansas, described in Bulletin No. 234 as Levee District No. 2, are being organized into a district for the purpose of constructing a levee system. As far as the Office is informed, this is the first district to organize along the Marais des Cygnes River in Kansas.

Contracts have been let recently for the construction of the improvements in the Burt-Washington County Drainage District, Nebraska. A representative of the Office conferred with the engineers and interested land owners relative to this work in 1914 and assisted in perfecting the plans.



On account of the recent heavy storms which have occurred in the Luxappalila River Drainage District, Alabama, the survey party has been disbanded and this work will be discontinued until the conditions are improved.

Reports Transmitted:

D-24G Panther Creek Drainage District, Ky., by H. H. Barrows and
J. V. Phillips.

Reports Received:

D-6 Bush River, Prince Edward Co., Va., by D. L. Yarnell.
D-8X Sandy Run Creek, N. C., by F. R. Baker.
D-9V Abandoned Rice Lands along the Cumbahee River, S. C., by C. W.
Okey and F. G. Eason.

Irrigated Lands

During the week ending December 18, D. G. Miller, S.D.E., was in Hershey, Nebraska, for the purpose of conferring with Mr. Jessup in regard to the work on the Hershey Drainage District. Mr. Miller was also at Hershey during the last week of the month, when both he and Mr. Jessup gave some addresses at several meetings of the landowners interested in that district.

Bids were received at Tempe, Arizona, until 2 p. m., December 14, for the construction of the Main Ditch, 8.4 miles, in Drainage District No. 1, Maricopa County. Advertisement for bids appeared on page 30, volume 74, No. 21, Engineering News of November 18.

Reports Transmitted:

D-34F Twin Falls, Idaho, (Progress) by W. G. Sloan.
D-42 Malheur Drainage District, Ore., by W. G. Sloan.
D-43 Drainage Situation in Owens River Valley, Inyo Co., Cal., by
W. W. Weir.

Reports Received:

D-39A Inspection trip into the Uintah Basin, Utah, by R. A. Hart.
D-39A J. S. Hendricks Tract, Richmond, Utah, by R. A. Hart.
D-43B Effect of Pumping from Shallow Well on Ground Water Table,
Kearney Park, Fresno, Cal., by W. W. Weir.

Run-Off Investigations

On December 15, F. E. Staebner, C.E.S., arrived at Fort Pierce, Florida, to take up the work of collecting data on drainage of Florida soils and run-off.

Tidal Marshes

During the latter part of the month, C. W. Okey, S.D.E., has been engaged on storm tide investigations along the Louisiana coast, the report of the abandoned rice lands along the Cumbahee River, S. C., having been completed about the middle of the month by Mr. Okey and Mr. Eason.

Organization, Financing, and Legal Regulations of Drainage Districts

During the month, H. S. Yohe, Expert on Drainage Organization, was at Cape Girardeau, Mo., and Osceola, Ark., studying the administration and organization of the Little River Drainage District, Mo., and Drainage District No. 9, Mississippi Co., Ark. He was also at Memphis, Tenn., where he conferred with engineers who have been closely identified with the organization and engineering features of drainage districts.

DIVISION OF IRRIGATION INVESTIGATIONS Samuel Fortier, Chief.

Projects:

Administration

The Washington Office has had considerable correspondence recently with E. J. Hoff, Mechanician, relative to improvements which may be specified in the next invitations for bids on water registers, an order for which will probably be placed within a few weeks. Suggestions from field men whose experiences with these instruments may have shown shortcomings which might be remedied without high cost would be very welcome. Similar ideas on any of the other apparatus used in the work of the division are also wanted for reference when future purchases are contemplated, as such suggestions are all that the Office has to rely upon in urging upon manufacturers improvements in high-priced apparatus which should meet the demands of the work as nearly as possible.

Members of the Washington force of Irrigation Investigations are attending the sessions of the Second Pan-American Scientific Congress which have to do with discussion of various irrigation matters. These are proving of such value that it is hoped that a compilation of the discussions may be prepared in abstract and copies sent to the field force of the division. As noted in the December field-letter, several members of the division are listed on the programs of the various sections. P. E. Fuller, I.E., who had been called to Washington prior to the opening of the Congress, read his paper in person, as did Mr. Fortier and Mr. Teele.

R. P. Teele, Irrigation Economist, returned from his field trip December 18. After leaving Berkeley, Mr. Teele called upon C. E. Tait, I.E., at Los Angeles, and W. W. McLaughlin at Riverside, where Mr. McLaughlin is conducting experiments to determine the effect of capillarity and gravity on the movement of water in the soil. At State College, N. Mex., he called upon F. L. Bixby, I.E., and upon the

director of the New Mexico Experiment Station with which the division is cooperating, the purpose of the call having to do with future work in the State. At Mesa, Ariz., Mr. Teele met P. E. Fuller and visited the experimental farm at Higley. He arrived in San Antonio, Tex., in time to attend with W. L. Rockwell, I. E., a session of the State Board of Water Engineers. Plans were formulated at this meeting for the work to be done under the cooperative agreement between the Office and the State Board. In New Orleans Mr. Teele planned future work in the rice belt with Prof. W. B. Gregory, I.E.

A conference of agents engaged in irrigation investigations in northern and central California was held at Berkeley, December 6 and 7, to arrange the details of the field work for 1915. Those present were Messrs. R. D. Robertson, S. H. Beckett, W. A. Hutchins, O. W. Israelsen, and Frank Adams.

Furniture has been requested for the new quarters in the Berkeley postoffice building. It is hoped to occupy these new quarters sometime in January. The entire Berkeley office force of Irrigation Investigations will move to these quarters except Mr. Hoff, E.M., although Frank Adams, I.M., will continue part of the time in the present headquarters in Budd Hall.

Utilization of Water

The State Water Commission of California has signified its desire to cooperate with the Office during 1916 in the study of the duty of water for rice in Sacramento Valley, California.

in
W. A. Hutchins, Assistant/Irrigation Economics, gathered data during December in the San Joaquin Valley and southern California on hydraulic fill dams; also data in southern California on irrigation of small fruits, the latter to be used in completing a report on that subject.

C. G. Haskell, I.E., has submitted progress report detailing the work carried on in Nevada during the past season. Mr. Haskell is now in Texas making a study of wells and well casings. This work will probably engage him during the winter.

R. B. Sleight, A.I.E., has submitted progress report of work at the Denver Irrigation field laboratory from the time of its establishment to December 31. The plot has been levelled and fenced, and equipment is now being assembled preparatory to the beginning of the experiments as soon as weather conditions will permit. A small laboratory building will be erected in order to provide for such inside work as will be necessary.

The bulletin by D. H. Bark, formerly Irrigation Engineer, on Economical Use of Water in Irrigation in Idaho, is now in press and will probably be available for distribution within a few weeks.

Flow of Water

F. C. Scobey, I.E., has submitted for publication a manuscript on "The Flow of Water in Wood-Stave Pipe." The text embodied not only a description of tests made by this division but also considers all other tests that are a matter of record. From all these tests a new general formula is derived for the design of wood-stave pipes, viewed from the carrying-capacity standpoint. For the sake of comparison four other formulas are analyzed on the basis of the given data from the various observations. Percentage comparison is made for observed velocities in the various pipes with the velocities as calculated by the various formulas for the given size of pipe with the given loss of head. In a similar manner the variation in the values of n in the Kutter formula, for various sizes of pipe and for the various velocities within a given size of pipe, is shown to be so radical that the writer suggests that the Kutter formula be left to its originally intended purpose, that of design of open channels. Diagrams are submitted for use in designing wood pipes, for showing the relative carrying capacities of various sizes of pipes on a given gradient, for the relative carrying capacity of various ages of pipes that were included in the tests considered (about 50 in number), and for general purposes of comparing the results that may be expected when any one of the various formulas are used. Extended tables give the elements of the various tests and percentage comparisons. A table also is given showing the comparison between the capacity of wood-stave pipe as against that of cast-iron and riveted pipe of various ages.

Measurement of Water

The professional paper by V. M. Cone, I.E., on "Flow Through Weir Notches with Thin Edges and Full Contractions" will be published at an early date in the Journal of Agricultural Research.

Customs, Regulations and Laws

Frank Adams, I.M., visited Morganhill, Santa Clara Valley, on December 11, to give advice on the formation of an irrigation district there. Later he and C. E. Tait, I.E., visited Palo Verde and Chuckawalla mesas, along Colorado River in Riverside County, Cal., where a large new irrigation project has been under consideration for several years.

Expert Advice and Assistance

Surveys have been made in the humid sections for the following plants, which are now under design by M. B. Williams, I.E.: Five acres surface irrigation for strawberries and truck crops, water to be pumped from Tuckahoe River; Elsworth Sommers, Tuckahoe, N. J.

Six acres spray irrigation for berry and truck crops, water to be pumped from deep well; Aaron Caurter, Fairlawn, N. J. Three acres spray irrigation and two acres surface irrigation for truck crops, water to be pumped from Spring Run; Leo Brandenburg, Woodridge, N. J. Five acres spray irrigation for truck crops, water to be pumped from 8 driven wells; Baron de Hirsch Agricultural School, Woodbine, N. J. Eight acres surface irrigation for truck crops from flowing well; Mrs. Fred Osborne, Ann Arbor, Michigan. Thirty acres surface irrigation for potatoes and general truck crops, water to be pumped from deserted coal mine; D. B. Zimmerman, Somerset, Pa. Thirty acres spray and 25 acres surface irrigation for berries and general truck crops, water to be pumped from Schuylkill River; Eastern Pennsylvania State Institution, Spring City, Pa.

